

## CLAIMS

1. A cobalt-chromium dental alloy comprising:  
about 60 to about 8% cobalt;  
about 15 to about 30% chromium;  
about 2 to about 20% manganese; and  
about 1 to about 15% aluminum, indium, gallium, tin, or germanium, or mixture  
thereof.

2. The cobalt-chromium alloy of claim 1 wherein aluminum is present in an  
10 amount of at least about 2%.

3. The cobalt-chromium dental alloy of claim 1 further comprising:  
up to about 20% iron, nickel, palladium, or platinum, or mixture thereof;  
up to about 10% gold;  
15 up to about 15% tantalum, niobium, molybdenum, tungsten, or vanadium or mixture  
thereof;  
up to about 6% iridium, ruthenium, rhenium, titanium, silicon, or copper or mixture  
thereof; and  
up to about 5% zirconium, hafnium, boron, yttrium, or a rare earth metal or mixture  
20 thereof.

4. The cobalt-chromium dental alloy of claim 1 having a coefficient of thermal  
expansion from about 15 to about  $18 \times 10^{-6}^{\circ}\text{C}$  at about room temperature to about 500°C.

25 5. The cobalt-chromium dental alloy of claim 1 having a Vickers Hardness of no  
greater than about 300 HV<sub>5</sub>.

6. A dental restoration comprising the cobalt-chromium alloy of claim 1.

7. The dental restoration of claim 6 further comprising a high-expansion porcelain on the cobalt-chromium alloy.

5 8. The dental restoration of claim 6 wherein the dental restoration comprises a crown, bridge, space maintainer, tooth replacement appliance, orthodontic retainer, denture, post, jacket, inlay, onlay, facing, veneer, facet, implant, abutment, splint, partial crown, teeth, cylinder, pin, connector or combination thereof.

10 9. A cobalt-chromium dental alloy comprising:  
about 65 to about 80% cobalt;  
about 18 to about 25% chromium;  
about 2 to about 10% manganese;  
about 2 to about 10%, iron, nickel, palladium, or platinum, or mixture thereof;  
15 about 1 to about 7% aluminum, indium, gallium, tin, or germanium, or mixture thereof;  
about 1 to about 5% gold; and  
about 0.1 to about 3% iridium, ruthenium, rhenium, titanium, silicon, or copper, or mixture thereof.

20 10. The cobalt-chromium dental alloy of claim 9 further comprising:  
up to about 5% tantalum, niobium, molybdenum, tungsten, or vanadium, or mixture thereof; and  
up to about 1% zirconium, hafnium, boron, yttrium, or a rare earth metal, or mixture 25 thereof.

11. The cobalt-chromium dental alloy of claim 9 having a coefficient of thermal expansion from about 15 to about  $18 \times 10^{-6}/^{\circ}\text{C}$  at about room temperature to about 500°C.

12. The cobalt-chromium dental alloy of claim 9 having a Vickers Hardness of no greater than about 300 HV<sub>5</sub>.

5 13. A dental restoration comprising the cobalt-chromium alloy of claim 9.

14. The dental restoration of claim 13 further comprising a high-expansion porcelain on the cobalt-chromium alloy.

10 15. The dental restoration of claim 13 wherein the dental restoration comprises a crown, bridge, space maintainer, tooth replacement appliance, orthodontic retainer, denture, post, jacket, inlay, onlay, facing, veneer, facet, implant, abutment, splint, partial crown, teeth, cylinder, pin, connector or combination thereof.

15



20

25